Part of the SOSCOE and logistics products development includes integration kits for complementary programs within the UA. Prototype kits will be developed and tested during SDD. The intent is to have common exportable SOSCOE capability (including logistics) that allows full integration of complementary programs and in lieu of vehicles into the UA maneuver force. Logistics command and control and integration of combat support and combat service support with combat decision making will be included.

During production and fielding, the UA will be fielded with a PBL concept. Performance-based agreements will be developed in conjunction with the user during SDD that state what the PM will deliver to the user in terms of specific metrics that may include performance, availability, reliability, footprint and life-cycle costs. The UA will have a product support integrator (PSI) who will coordinate and manage product support provided by each product support provider (PSP). PSPs will deliver operational availability within the logistical footprint and cost constraints. PSP performance will be measured and incentives awarded for meeting or exceeding goals. The PSI will enforce PSP performance. During SDD, the PSI is the LSI working with PM FCS.

In summary, the Army is transforming the way it designs and supports systems through extensive design influence in the FCS program and through designing systems that will enable embedding logistics functions in the common operating environment in the UA. At the same time, the Army is moving to a performance-based approach to provide product support to the UA. The FCS program has just begun to address the many facets of achieving ORD requirements and will need the help of the entire logistics community to achieve these objectives.

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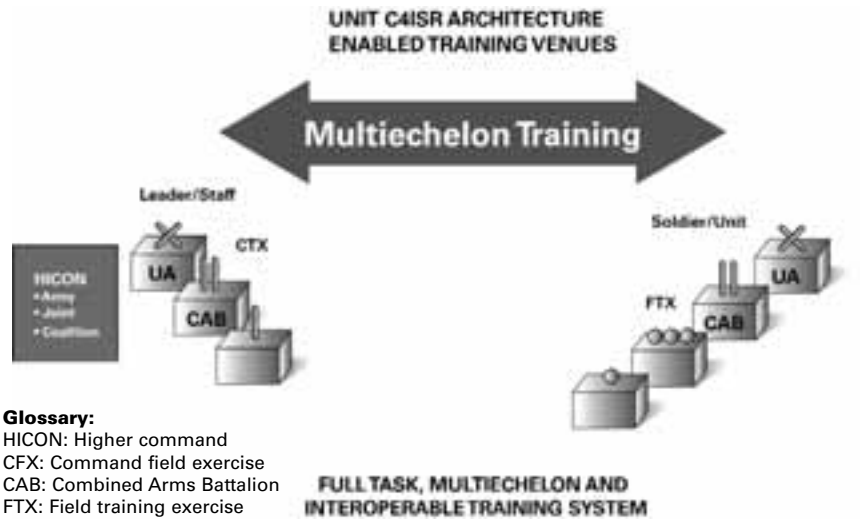
Training the Future Combat Systems

MAJ Larry S. Anderson and Jeff Simons

The key capability of the Future Combat Systems (FCS) training environment is an unprecedented embedded training (ET) capability inherent to the operational system-of-systems (SoS). This ET is derived from the FCS Mission Needs Statement that states: "Training must be inherent in FCS design to enable units to rapidly deploy without the need for system-specific training and allow individual and collective training on a digital terrain representation of the mission area."

Unprecedented in Army acquisition is the approval of training as a Key Performance Parameter (KPP). This places training equal to other mission-critical capabilities that will enable the FCS Soldier to train and fight like never before. The 2003 FCS Operational Requirements KPP states: "The FCS FoS [Family-of-Systems] must have an embedded individual and collective training capability that supports live, virtual and constructive training environments."

The requirement to host an ET capability as part of the materiel acquisition process for operational systems has been around since the late 1980s, directed by GEN Maxwell R. Thurmond, then the Commander, U.S. Army Training and Doctrine Command (TRADOC), requiring systems be developed with ET inherent to the platforms. However, achieving an ET capability necessitated that the training be developed commensurate with the operational systems. The processing



Glossary:
HICON: Higher command
CFX: Command field exercise
CAB: Combined Arms Battalion
FTX: Field training exercise

capacity and digital infrastructure made it impossible — until now. FCS now affords the Army an opportunity to achieve this unprecedented capability during the system development and demonstration phase.

ET Environment

So what is ET and why is it crucial that it become an inherent FCS program component? According to TRADOC Pamphlet 350-73, *Objective Force ET Users Functional Description (June 2003)*, ET is defined as a function hosted in hardware and/or software, integrated into the overall equipment configuration that supports training, assessment and control of exercises on the operational equipment, and when activated, starts a training session overlaid on the system's normal operational mode.

The June 2003 Operational and Organizational (O&O) Plan describes how the brigade-sized unit of action (UA) is expected to operate in 2010 through 2020. These documents provide the foundation that directs how our forces will operate in the future. Having ET in the operational platform enables our warfighters to meet operational requirements by providing the necessary flexibility and technology to train anytime, anywhere.

The training strategy outlined in the O&O identifies an ET system that executes within live, virtual and constructive environments. ET provides the means to achieve a blended capability of these traditionally independent training environments. This capability provides the UA with an increased level of competency that is adaptive and embedded within the UA. This incorporates leadership, cohesion and unit design that will help fuel the core performance of Soldiers, leaders and staffs. This ET strategy supports Soldier and leader proficiencies in tactical and technical tasks required in full-spectrum operations. The figure shows how the ET strategy will support training at all echelons.

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The FCS ET system will provide warfighters with the ability to train in the institution, at Combat Training Centers (CTCs), while at home station or deployed. The ET system is being developed as an integral part of the FCS system design and, while the FCS platforms are in training mode, will stimulate and receive information from the operational vetronics, executed through the platforms' Warrior Machine Interface and command, control, communications, computers, intelligence, surveillance and reconnaissance (C4ISR) architectures; and use the organic decision aides and vehicle management software.

Platform-resident simulation-based training support packages (TSPs) will provide the operator, individual, crew and combined arms unit a complete, mission-based training event. These TSPs are based on the FCS missions defined in the O&O, to include a progressive training matrix allowing for training progression. TSPs will include individual, crew and multiechelon tasks that leaders will be able to modify to fit their unit mission needs.

This capability will also allow the FCS FoS to interoperate with our current forces and their training aides and other collective training capabilities. Also, ET provides the capability of reach, allowing connectivity between the newly conceptualized Home Station Operations Center or institution and the warfighter. FCS Soldiers will be able to download required training products via the network to update their skills or to get operational-relevant information.

To achieve a training capability for the institutions, the software hosted on the operational systems will be ported to platform replicas (ranging from high-end manned modules to desktop environments) to create stand-alone trainers. This package will provide the institutions with networked reconfigurable assets (called Network Reconfigurable Full-Task Trainers) available to Soldiers prior to arriving at their assigned UA. This is necessary during the initial stages of the FCS fielding and training process because of the lack of operational platform availability.

Acquisition Strategy

A key tenet associated with the successful FCS training environment acquisition was establishing a Training Systems Integration Integrated Product Team (TSI IPT). Consistent with other elements of the Lead Systems Integrator (LSI), the TSI IPT executes the management and technical integration necessary for hosting the FCS training capability as part of the FCS operational environment. A strongly coupled government and LSI team has been forged to ensure that the ET capability for FCS becomes a reality. The Program Executive Office for Simulation, Training and Instrumentation (PEO STRI) was selected as the government co-lead to the LSI's Training IPT because of its expertise in the modeling and simulation domain and as a result of its current technical capabilities portfolio that is strategically postured to assist FCS training development.

An early question facing the TSI IPT was how to best establish the supplier base necessary to achieve the operational environment ET capability. To better ensure that the ET capability is an inherent part of the operational system, an acquisition strategy was embraced that requires training be developed commensurate with development of each FCS end item by the contracted supplier of that end item. The TSI IPT concluded that a separate host of suppliers, acting independent of the operational system development, would be hindered in their ability to introduce the developed software into the SoS. To overcome this problem, the TSI IPT established the acquisition paradigm whereby the operational end item suppliers for FCS (e.g., Manned Ground Vehicles) are accountable for achieving the training requirements for constructive, live and virtual training. Each contract let by the LSI has the training requirements inherent as part of the contract action and a separate contract line item has been established under the cognizance of the TSI IPT to control cost, schedule and performance.

This acquisition strategy has an inherent challenge which, if not explicitly addressed by other means, would be a significant hurdle — collective training. Whereas each supplier of the varying operational systems can best assess and develop individual and crew training capabilities, the ability for the multiplicity of different suppliers to achieve a common collective training capability is problematic. To address this challenge, the TSI IPT established a second key tenet. The TSI IPT will provide the suppliers (using previous government investments) the foundation of a collective training environment from which adaptations can be made. These common components form complementary programs.

Complementary Programs

A set of common components, which will build the foundation for the collective training environment, will be adapted from four key ongoing Army programs. Three of these programs, managed by PEO STRI, include the One Semi-Automated Forces (OneSAF), the Common Training Instrumentation Architecture (CTIA) and the One Tactical Engagement Simulation System (OneTESS). These programs are intended to provide the varying training enablers for the FCS ET paradigm.

The OneSAF program provides the heart of the collective training capability, establishing a foundation of training enablers (or common components) to include the scenario generation capability, computer-generated forces and after-action review. Interoperability and integration of CTIA components create the ability to execute in the live-training construct at CTC's home station and while deployed. Elements of CTIA will also round out the training enablers from a live perspective need. The OneTESS will be the objective tactical engagement capability to the live force-on-force engagement arbitration.

An additional program currently managed by TRADOC, the Army Training Information Architecture provides the means by which training management and reach to the Army Knowledge Enterprise is achieved, providing ready access to TSPs while deployed. Collectively, these programs provide the foundation of a collective training environment, overcoming the challenge inherent in multiple developers, while also significantly reducing the FCS program cost burden by taking advantage of existing investments — an estimated cost avoidance of $300 million.

The Army still has a requirement to train as it plans to fight, but with the expanded battlefield, increased operational tempo and personnel tempo, we must find better ways of "how" to train. A leader will have the ability to place warfighters in a blended live, virtual and constructive environment resident on their operational equipment. Executing a training event from a motor pool or assembly area will become commonplace in the future.

This exportability and tailorability is where the power of ET is realized as a force multiplier. ET will provide commanders with the ability to train their forces anytime and anywhere.

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Benefits and Impacts of Using Tactical Sensor Payloads

MAJ Michael K. Wegler and Michael A. Johnson

FUTURE COMBAT SYSTEMS
FCS
One Team-The Army/Defense/Industry

The U.S. Army is accelerating its effort to develop and field unmanned aerial vehicles (UAVs) at the brigade, division and corps levels. This effort will enhance the Army's capability to find, identify, attack and destroy enemy troop concentrations and simultaneously reduce U.S. force vulnerability. The synthetic aperture radar/moving target indicator (SAR/MTI) sensor payload is being developed to perform UAV reconnaissance, surveillance and target acquisition (RSTA) missions.

Product Manager Robotic and Unmanned Sensors (PM RUS), part of Project Manager Night Vision/Reconnaissance Surveillance and Target Acquisition (PM NV/RSTA) under Program Executive Officer (PEO) Intelligence, Electronic Warfare and Sensors (IEW&S), hypothesized that Army military occupational specialty (MOS) 96U, UAV operators, with minimal additional training, could effectively employ a synthetic aperture radar and moving target indicator sensor payload to perform RSTA missions. PM

TUAV Operator

RUS designed the Sensor Employment Assessment Program (SEAP) to test this hypothesis. SEAP includes an engineering test; a military demonstration, analysis and feedback (MDAF); and an operational demonstration, analysis and feedback (ODAF). The engineering test and MDAF phases were completed in April and May 2003, respectively.

Tactical UAV Radar (TUAVR), a SAR/MTI sensor payload, developed under an advanced technology demonstration program, was installed on a Hunter UAV and configured to interface with the Hunter C-Band datalink